

Magnitude 7.1 MOLUCCA SEA

Saturday, November 15, 2014 at 02:31:40 UTC

A 7.1 magnitude earthquake occurred 150 kilometers (93 miles) off the coast of Ternate, Indonesia. The 35 kilometer deep (21.7 miles) earthquake struck at 10:31 a.m. local time.

The earthquake did not produce any destructive tsunami waves.



Ternate is an island in the Maluku Islands of eastern Indonesia.



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Indonesia is an archipelago comprising approximately 17,508 islands. It has 34 provinces with over 238 million people, and is the world's fourth most populous country. Despite its large population and densely populated regions, Indonesia has vast areas of wilderness that support the world's second highest level of biodiversity.



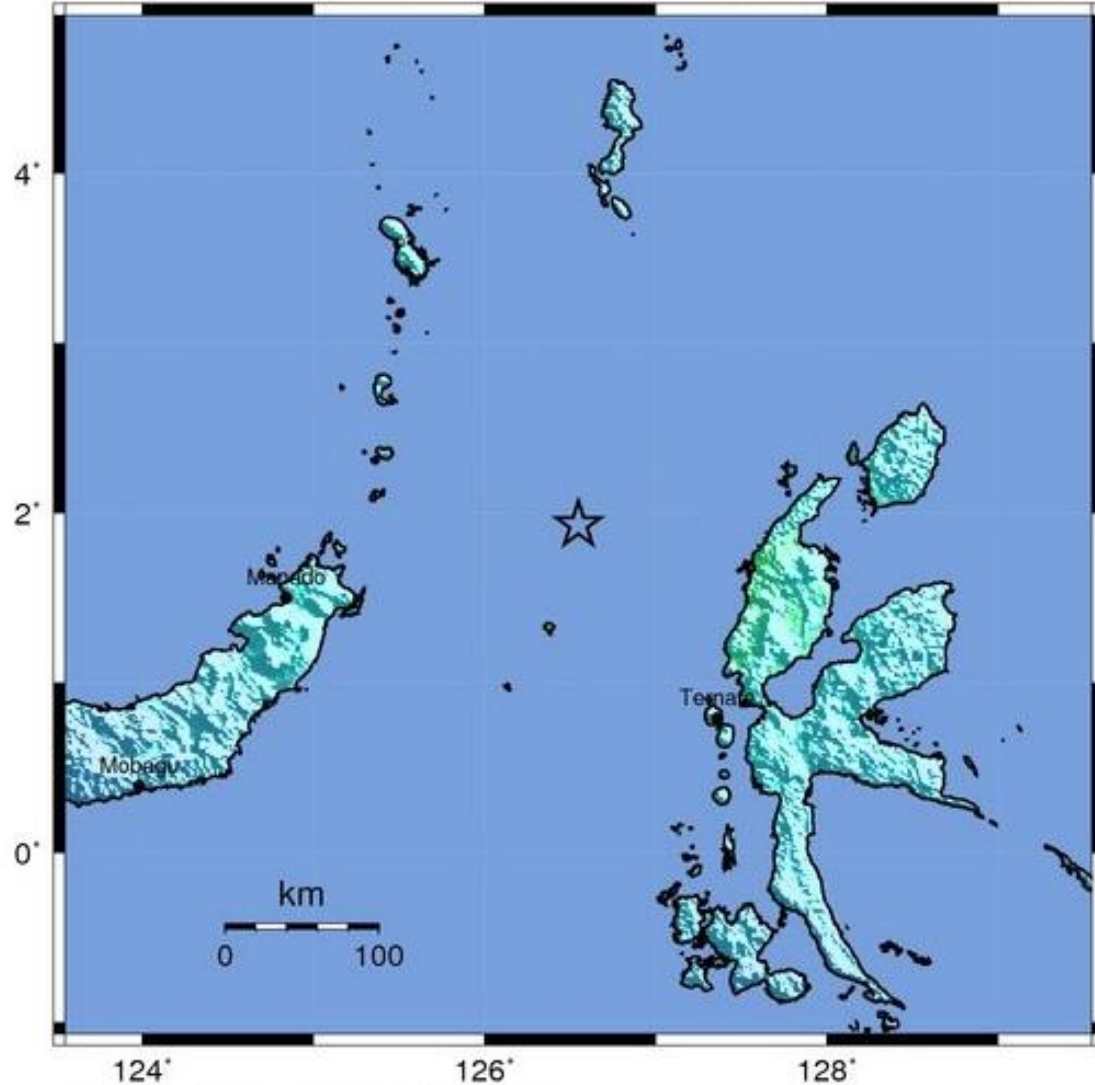
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The nearest islands experienced moderate shaking.

Modified Mercalli Intensity



Perceived Shaking
Extreme
Violent
Severe
Very Strong
Strong
Moderate
Light
Weak
Not Felt

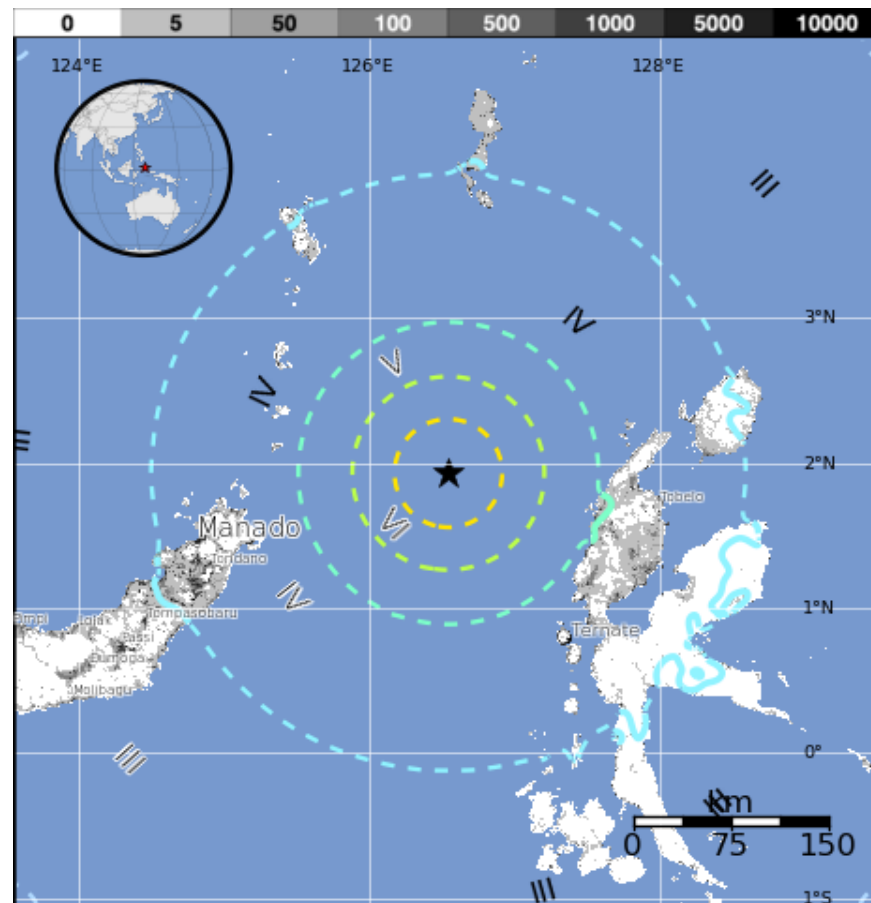


The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

83,000 people were exposed to moderate shaking from this earthquake.

The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table below.

Image courtesy of the US Geological Survey



Estimated Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	~*	784k*	2,517k	83k	0k	0k	0k	0k	0k
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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The Pacific, Philippine, and Australian Plates meet in a complex arrangement of subduction zones in the western Pacific Ocean.

- Convergent plate boundary
- Divergent plate boundary
- Transform plate boundary



Image courtesy of the US Geological Survey

In detail, there are numerous microplates (fragments of larger plates) with convergent, divergent, and transform (strike-slip) boundaries between them.

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Historical seismicity is plotted in the region of the earthquake. Tectonics in eastern Indonesia are extremely complex. At the location of this earthquake, the Sunda and Philippine Plates are converging in an east-west direction at a rate of approximately 109 mm/yr.

A cross section reveals both deep earthquakes within the subducting Philippine Plate and a pattern of shallow seismicity in the region.

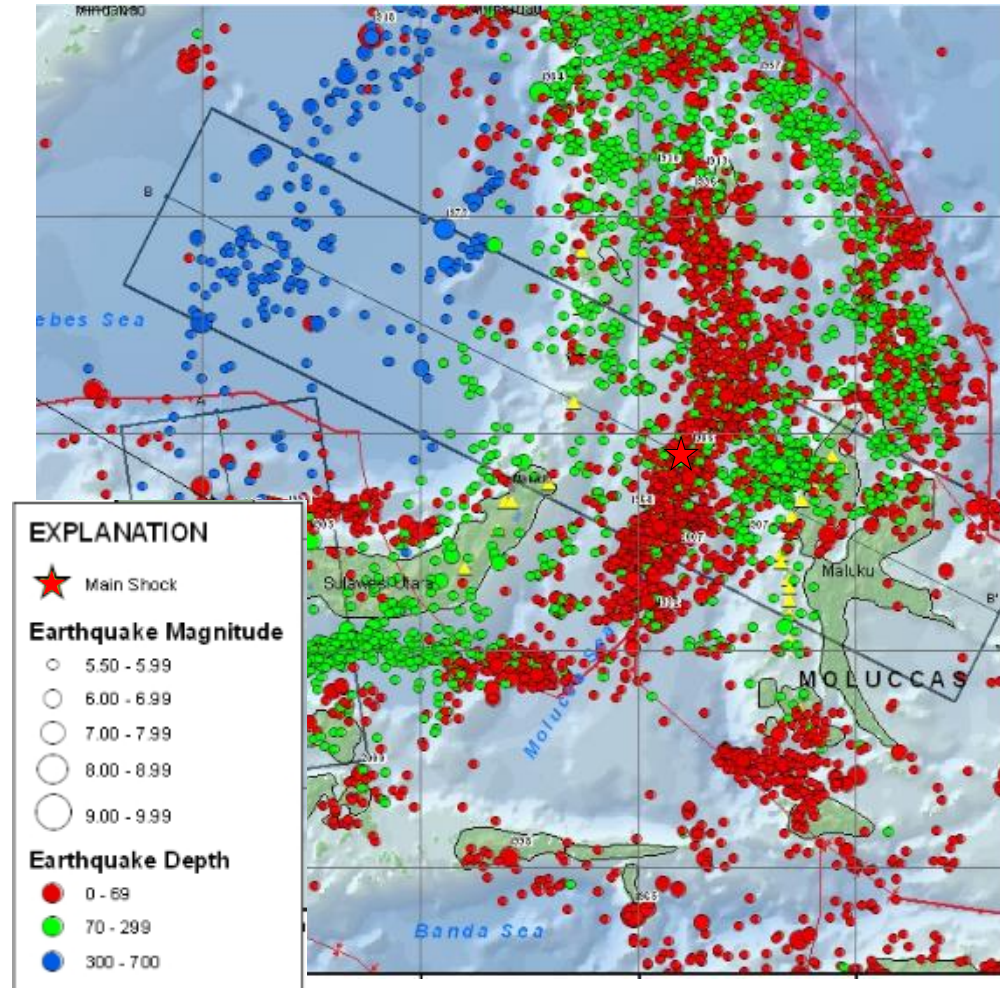
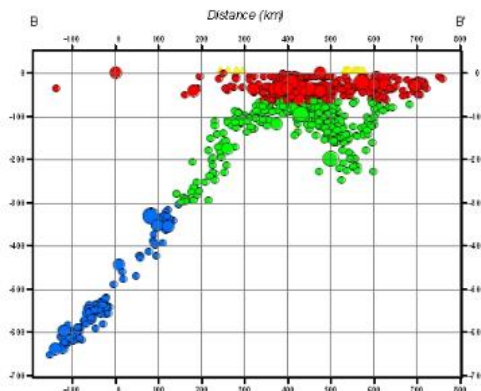
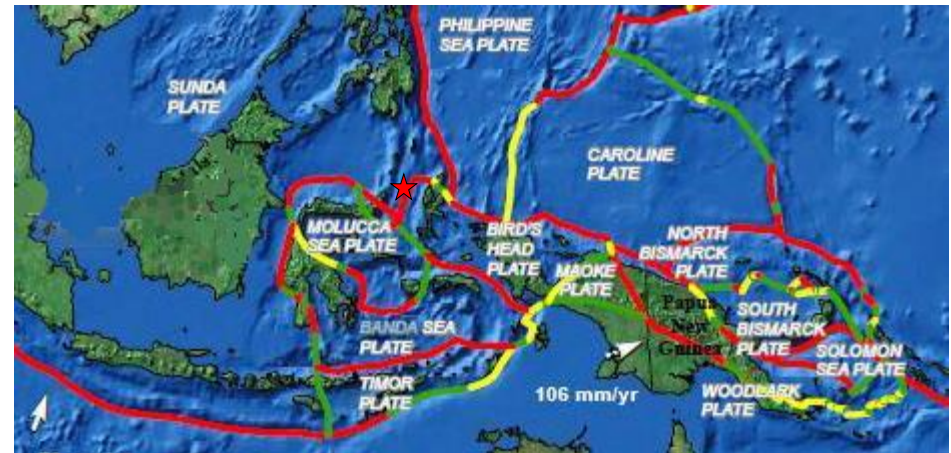
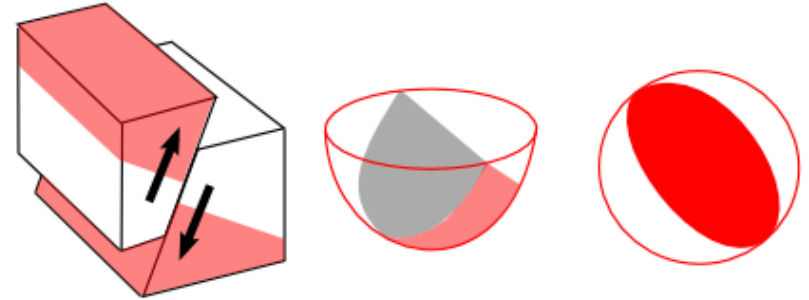


Image courtesy of the US Geological Survey

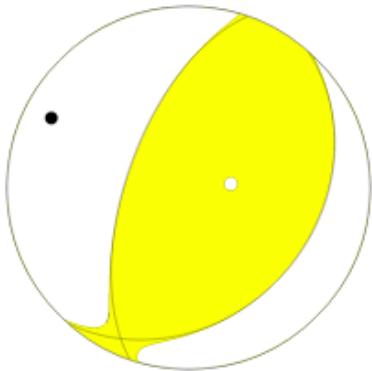
The focal mechanism for the earthquake indicates reverse faulting, dipping either steeply towards the northwest, or more gently towards the southeast, in line with the general trend of earthquakes in the region.

According to the USGS, this earthquake most closely aligns with the boundary between the broader Sunda Plate and the Birds Head microplate.

Reverse/Thrust/Compression



- Convergent plate boundary
- Divergent plate boundary
- Transform plate boundary



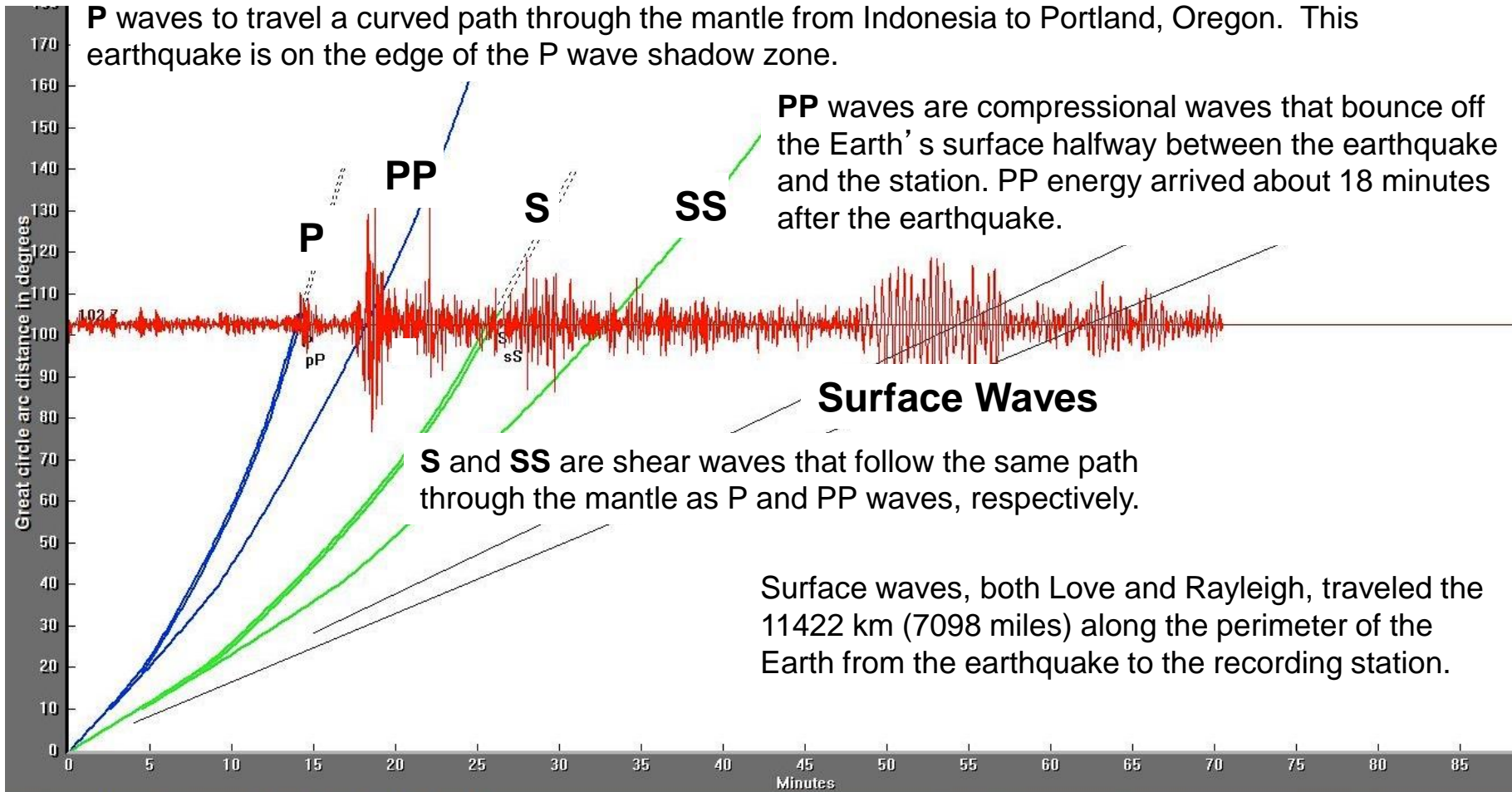
The tension axis (white dot) reflects the minimum compressive stress direction.
The pressure axis (black dot) reflects the maximum compressive stress direction.

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The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is 11422 km (7098 miles, 102.9°) from the location of this earthquake.

Following the earthquake, it took approximately 13 minutes for the compressional **P** waves to travel a curved path through the mantle from Indonesia to Portland, Oregon. This earthquake is on the edge of the P wave shadow zone.



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